This listing of claims will replace prior versions, and listings, of claims in the application:

<u>Listing Of Claims:</u>

1   1. (Currently Amended) Interferometric apparatus comprising:

2   means for defining a reference frame;

3   a translation stage;

4   an electro-mechanical arrangement for selectively translating said translation

5   stage in at least one of at least two orthogonal directions with respect to said reference

6   frame;

7   at least one thin, elongated mirror mounted in a predetermined manner with

8   respect to said reference frame, said at least one thin, elongated mirror having a

9   reflecting surface and a nominal datum line extending along its longitudinal dimension;

10   at least one interferometer subsystem<u>, including a dynamic interferometer,</u>

11   mounted in a predetermined manner with respect to said at least one thin, elongated

12   mirror; adapted to cooperate with said at least one thin, elongated mirror to measure the

13   displacement of said translation stage in at least one azimuth; and adapted to measure

14   the local slope of said at <u>least</u> one thin, elongated mirror along and orthogonal to its

15   datum line and its local displacement normal to said reflecting surface;

16   control means having a mode of operation for selectively translating said

17   translation stage, said at least one thin, elongated mirror and said at least one

18   interferometer subsystem moving relative to one another in said mode of operation so

19   that said at least one interferometer subsystem scans said at least one thin, elongated

20   mirror along its corresponding datum line to generate a signal containing information

21   indicative of the ~~angular change and surface departure~~ <u>topography</u> of said reflecting

22   surface ~~thereof~~ along with any contributions thereto due to variations present from said

23   electro-mechanical arrangement per se; and

24   signal and analysis means for extracting said information contained in said signal

25   and ~~determining the local shape of said at least one thin, elongated mirror~~ <u>developing</u>

26   <u>correction signals to compensate for errors in optical path length and errors in beam</u>

27   <u>direction related to the shape of said reflecting surface</u> while said control means is in

28   said mode of operation.

2. (Original) The interferometric apparatus of claim 1 wherein said at least one thin, elongated mirror is mounted to said translation stage for movement therewith and said at least one interferometer subsystem is fixedly mounted off said translation stage.

3. (Original) The interferometric apparatus of claim 1 wherein said at least one interferometer subsystem is fixedly mounted to said translation stage for movement therewith and said at least one thin, elongated mirror is fixedly mounted off said translation stage.

4. (Original) The interferometric apparatus of claim 1 wherein said control means is structured and arranged to have another mode of operation in which the motion of said translation stage is measured in at least one azimuth with respect to said reference frame.

1   5. (Currently Amended) The interferometric apparatus of claim 1 comprising at
2   least two, thin elongated mirrors having reflecting surfaces orthogonally arranged with
3   respect to one another and each including a nominal datum line extending along its
4   longitudinal dimension and at least two interferometer subsystems at least in part
5   mounted off said translation stage, each of said at least two interferometer subsystems
6   being adapted to scan a corresponding one of said thin, elongated mirrors and
7   configured to measure the local slope of the scanned mirror along and orthogonal to its
8   datum line and its local displacement normal to said reflecting surface, said control
9   means being further configured in said mode of operation to selectively translate said
10   translation stage in one or all of its possible directions of motion so that at least one of
11   said interferometer subsystems scans a corresponding one of said thin, elongated
12   mirrors along its corresponding datum line to generate a signal containing information
13   indicative of the ~~angular change and surface departure~~surface topography of its
14   corresponding reflecting surface along with any contributions thereto due to variations
15   present from said electro-mechanical arrangement per se while the other of said
16   interferometer subsystems generates a signal containing at least information about the
17   angular change of said translation stage, said signal combining and analysis means
18   extracting information contained in said signals ~~and determining the local shape~~to

19   develop correction signals to compensate for errors in optical path length and errors in
20   beam direction related to the shape of said at least two thin, elongated mirrors.

6. (Original) The apparatus of claim 1 wherein said at least one interferometer subsystem comprises a single beam, plane mirror interferometer subsystem.

7. (Currently Amended) The interferometric apparatus of claim 1 wherein said interferometric apparatus comprises three orthogonally arranged thin, elongated mirrors and three corresponding interferometer subsystems mounted for relative motion with respect to one another while said control means is in said mode of operation to measure the local shapesurface topography of said mirrors in three dimensions.

8. (Original) The interferometric apparatus of claim 1 further including a photolithographic wafer mount located on said translation stage for movement therewith.

9. (Original) The interferometric apparatus of claim 8 further including a photolithographic exposure unit fixedly mounted to said reference frame for forming masked patterns on wafers located on said translation stage.

1   10. (Currently amended) Interferometric method comprising the steps of:
2   defining a reference frame;
3   providing a translation stage for movement with respect to said reference frame;
4   selectively translating said translation stage in at least one of at least two
5   orthogonal directions with respect to said reference frame;
6   mounting at least one thin, elongated mirror in a predetermined manner with
7   respect to said reference frame, said at least one thin, elongated mirror having a
8   reflecting surface and a nominal datum line extending along its longitudinal dimension;
9   mounting at least one interferometer subsystem, including a dynamic
10   interferometer, in a predetermined manner with respect to said at least one thin,
11   elongated mirror where said at least one interferometer subsystem is adapted to
12   cooperate with said at least one thin, elongated mirror to measure the displacement of
13   said translation stage in at least one azimuth and is also adapted to measure the local

14   slope of said at one thin, elongated mirror along and orthogonal to its datum line and its

15   local displacement normal to said reflecting surface;

16   selectively translating said translation stage in a mode of operation in which said

17   at least one thin, elongated mirror and said at least one interferometer subsystem move

18   relative to one another in said mode of operation so that said at least one interferometer

19   subsystem scans said at least one thin, elongated mirror along its corresponding datum

20   line to generate a signal containing information indicative of the ~~angular change and~~

21   ~~surface departure~~topography of said reflecting surface ~~thereof~~ along with any other

22   contributions thereto due to variations present during said step of selectively translating

23   said translation stage; and

24   extracting said information contained in said signal and ~~determining the local~~

25   ~~shape~~developing correction signals to compensate for errors in optical path length and

26   errors in beam direction related to the shape of said reflecting surface of said at least

27   one thin, elongated mirror while is in said mode of operation.

11. (Original) The interferometric method of claim 10 wherein said at least one
thin, elongated mirror is mounted to said translation stage for movement therewith and
said at least one interferometer subsystem is fixedly mounted off said translation stage.

12. (Original) The interferometric method of claim 10 wherein said at least one
interferometer subsystem is fixedly mounted to said translation stage for movement
therewith and said at least one thin, elongated mirror is fixedly mounted off said
translation stage.

13. (Original) The interferometric method of claim 10 having another mode of
operation in which the motion of said translation stage is measured in at least one
azimuth with respect to said reference frame.

1   14. (Currently Amended) The interferometric method of claim 10 in which there

2   are provided at least two, thin elongated mirrors having reflecting surfaces orthogonally

3   arranged with respect to one another with each including a nominal datum line extending

4   along its longitudinal dimension and at least two interferometer subsystems at least in

5   part mounted off said translation stage, each of said at least two interferometer

6   subsystems being adapted to scan a corresponding one of said thin, elongated mirrors

7   and configured to measure the local slope of the scanned mirror along and orthogonal to

8   its datum line and its local displacement normal to said reflecting surface, said method

9   being further configured in said mode of operation to selectively translate said translation

10   stage in one or all of its possible directions of motion so that at least one of said

11   interferometer subsystems scans a corresponding one of said thin, elongated mirrors

12   along its corresponding datum line to generate a signal containing information indicative

13   of the ~~angular change and surface departure~~topography of its corresponding reflecting

14   surface along with any contributions thereto due to variations present from any other

15   contributions present during said step of selectively translating said translation stage

16   while the other of said interferometer subsystems generates a signal containing at least

17   information about the angular change of said translation stage, said step of extracting

18   information contained in said signals ~~determining the local shape~~developing correction

19   signals to compensate for errors in optical path length and errors in beam direction

20   related to the shape of said at least two thin, elongated mirrors.

15. (Original) The interferometric method of claim 10 wherein said at least one interferometer subsystem comprises a single beam, plane mirror interferometer

16. (Original) The interferometric method of claim 10 in which there are provided three orthogonally arranged thin, elongated mirrors and three corresponding interferometer subsystems mounted for relative motion with respect to one another while in said mode of operation to measure the local shape of said mirrors in three dimensions.

17. (Original) The interferometric method of claim 10 further including the step of mounting a photolithographic wafer on said translation stage for movement therewith.

18. (Original) The interferometric method of claim 17 further including photolithographically exposing said wafer from said reference frame with masked patterns of illumination.

1   19. (Previously Added) Interferometric apparatus comprising:

2   means for defining a reference frame;

3   a translation stage;

4   an electro-mechanical arrangement for selectively translating said translation

5   stage in at least one of at least two orthogonal directions with respect to said reference

6   frame;

7   at least two thin elongated mirrors mounted in a predetermined manner with

8   respect to said reference frame, said at least two thin elongated mirrors each having

9   reflecting surfaces orthogonally arranged with respect to one another and each including

10   a nominal datum line extending along its longitudinal dimension;

11   at least two interferometer subsystems mounted in a predetermined manner with

12   respect to said at least two thin elongated mirrors and adapted to cooperate with said at

13   least two thin elongated mirrors to measure the displacement of said translation stage in

14   at least one azimuth; each of said at least two interferometer subsystems being adapted

15   to scan a corresponding one of said two thin elongated mirrors and configured to

16   measure the local slope of the scanned mirror along and orthogonal to its datum line and

17   its local displacement normal to said reflecting surface;

18   control means having a mode of operation for selectively translating said

19   translation stage, said control means being configured in said mode of operation to

20   selectively translate said translation stage in one or all of its possible directions of motion

21   so that at least one of said interferometer subsystems scans a corresponding one of said

22   thin, elongated mirrors along its corresponding datum line to generate a signal

23   containing information indicative of the angular change and surface departure of its

24   corresponding reflecting surface along with any contributions thereto due to variations

25   present from said electro-mechanical arrangement per se while the other of said

26   interferometer subsystems generates a signal containing at least information about the

27   angular change of said translation stage, said signal combining and analysis means

28   extracting information contained in said signals and determining the local shape of said

29   at least two thin, elongated mirrors; and

30   signal and analysis means for extracting said information contained in said signal

31   and determining the local shape of said at least one thin, elongated mirror while said

32   control means is in said mode of operation.

1   20. (Previously Added) Interferometric method comprising the steps of:

2   defining a reference frame;

3   providing a translation stage for movement with respect to said reference frame;

4   selectively translating said translation stage in at least one of at least two

5   orthogonal directions with respect to said reference frame;

6   mounting at least two, thin elongated mirrors in a predetermined manner with

7   respect to said reference frame, said at least two thin elongated mirrors each having

8   reflecting surfaces orthogonally arranged with respect to one another and each including

9   a nominal datum line extending along its longitudinal dimension;

10   mounting at least two interferometer subsystems mounted in a predetermined

11   manner with respect to said at least two thin elongated mirrors and adapted to cooperate

12   with said at least two thin elongated mirrors to measure the displacement of said

13   translation stage in at least one azimuth; each of said at least two interferometer

14   subsystems being adapted to scan a corresponding one of said two thin elongated

15   mirrors and configured to measure the local slope of the scanned mirror along and

16   orthogonal to its datum line and its local displacement normal to its reflecting surface;

17   selectively translating said translation stage in a mode of operation in which said

18   at least said two, thin elongated mirrors and said at least two interferometer subsystems

19   move with respect to one another in one or all of said translation stage's possible

20   directions of motion so that at least one of said interferometer subsystems scans a

21   corresponding one of said at least two thin elongated mirrors along its corresponding

22   datum line to generate a signal containing information indicative of the angular change

23   and surface departure of its corresponding reflecting surface along with any

24   contributions thereto due to variations present from said electro-mechanical

25   arrangement per se while the other of said interferometer subsystems generates a signal

26   containing at least information about the angular change of said translation stage; and

27   extracting said information contained in said signal and determining the local

28   shape of said at least two thin, elongated mirrors.

1   --21. (New) Interferometric apparatus comprising:

2   at least one interferometer including a mirror moveably mounted for displacement

3   along a path of travel, said interferometer being adapted to direct a measurement beam

4   with a predetermined diameter, d, at the mirror to generate a measurement signal

5   containing information indicative of the relative displacement of said mirror and to

6   generate an information signal indicative of the topography of the mirror and direction of

7   travel of said measurement beam as reflected from said mirror at points where said

8   measurement beam impinges on said mirror after having made only one pass thereto;

9   and

10   signal and analysis means for operating on said information signal to develop

11   correction signals to compensate said measurement signal for errors in optical path

12   length and errors in beam direction of said measurement beam related to the shape of

13   said movably mounted mirror and its angular orientation while moving.--